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THE COGNITIVE ENVIRONMENTS OF URBAN PRE-SCHOOL CHILDREN. MANUAL OF INSTRUCTIONS FOR ADMINISTERING AND SCORING MATERNAL LANGUAGE STYLES.

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THIS MANUAL DESCRIBES MEASURES USED IN "THE COGNITIVE ENVIRONMENTS OF URBAN PRE-SCHOOL CHILDREN" PROJECT AT THE UNIVERSITY OF CHICAGO. THE SAMPLE FOR THE STUDY CONSISTED OF 163 NEGRO MOTHER-CHILD PAIRS SELECTED FROM 3 SOCIOECONOMIC CLASSES BASED ON THE FATHER'S OCCUPATION AND THE PARENTS' EDUCATION. A FOURTH GROUP INCLUDED FATHER-ABSENT FAMILIES. THE MOTHERS WERE INTERVIEWED AT HOME AND THE MOTHERS AND CHILDREN WERE TESTED AT THE UNIVERSITY OF CHICAGO WHEN THE CHILDREN WERE 4 YEARS OLD. FOLLOW-UP DATA WERE OBTAINED WHEN THE CHILDREN WERE 6 AND AGAIN WHEN THEY WERE 7. IN ORDER TO DETERMINE MATERNAL LANGUAGE STYLES, LANGUAGE SAMPLES WERE OBTAINED FROM VERBATIM TRANSCRIPTS OF TAPE-RECORDED RESPONSES TO (1) THE TYPICAL-DAY QUESTION (DESCRIBED IN PS 000 482), (2) THE MOTHER-TEACHER PICTURE (DESCRIBED IN PS 000 481), AND (3) THE CHILDREN'S APPERCEPTION TEST CARD NO. 3. LANGUAGE SAMPLES WERE ANALYZED AND SCORED, USING THE CRITERIA DESCRIBED IN THE MANUAL, FOR (1) MEAN SENTENCE LENGTH, (2) MEAN PRE-VERB LENGTH, (3) UNCOMMON ADJECTIVES, (4) UNCOMMON ADVERBS, (5) VERB ELABORATION, (6) ABSTRACTION, (7) STRUCTURE ELABORATION, AND (8) CONTENT ELABORATION. THE PRINCIPAL COMPONENT FACTOR ANALYSIS DISCLOSED A SINGLE FACTOR INVOLVING (1), (2), (5), AND (7) ABOVE. SCORES ON THESE FACTORS WERE CONVERTED TO Z-SCORES, AND A MEAN Z-SCORE WAS COMPUTED FOR EACH LANGUAGE SAMPLE. THESE WERE THEN AVERAGED FOR EACH SUBJECT TO OBTAIN THE AVERAGE LANGUAGE ELABORATION T-SCORE. THE COMPLETE SET OF PROJECT MANUALS COMPRISES PS 000 475 THROUGH PS 000 492. (DR)

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THE COGNITIVE ENVIRONMENTS OF URBAN PRE-SCHOOL CHILDREN

Robert D. Hess, Principal Investigator

MANUAL OF INSTRUCTIONS

FOR ADMINISTERING AND SCORING

MATERNAL LANGUAGE STYLES

The measures described in this manual were developed in the project, Cognitive Environments of Urban Pre-School Children, supported by: Research Grant #R-34 from the Children's Bureau, Social Security Administration, and the Early Education Research Center, National Laboratory in Early Education, Office of Education, both of the U.S. Department of Health, Education, and Welfare; the Division of Research, Project Head Start, U.S. Office of Economic Opportunity; the Ford Foundation Fund for the Advancement of Learning; and grants-in-aid from the Social Science Research Committee of the Division of Social Sciences, University of Chicago.

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THE COGNITIVE ENVIRONMENTS OF URBAN PRE-SCHOOL CHILDREN

The research sample for the Cognitive Environment Study was composed of 163 pairs of Negro mothers and their four-year-old children, from three socioeconomic classes, defined by father's occupation and parents' education; upper-middle, professional and executive, with college education; upper-lower, skilled and blue collar, with high school education; lower-lower, semiskilled and unskilled, with no greater than tenth-grade education; a fourth group included father-absent families living on public assistance, otherwise identical to the lower-lower class group.

Subjects were interviewed in the home, and mothers and children were brought to the University of Chicago campus for testing, when the children were four years old. Follow-up data were obtained from both mother and child when the child was six years of age, and again at seven years.

Principal Investigator for the project is Professor Robert D. Hess, formerly Director, Urban Child Center, University of Chicago, now Lee Jacks Professor of Child Education, School of Education, Stanford University.

Co-Investigator for the follow-up study is Dr. Virginia C. Shipman, Research Associate (Associate Professor) and Lecturer, Committee on Human Development, and Director, Project Head Start Evaluation and Research Center, University of Chicago, who served as Project Director for the pre-school phase of the research.

Dr. Jere Edward Brophy, Research Associate (Assistant Professor), Committee on Human Development, University of Chicago, was Project Director for the follow-up study and participated as a member of the research staff of the pre-school study.

Dr. Roberta Meyer Bear, Research Associate (Assistant Professor), Committee on Human Development, University of Chicago, participated as a member of the research staff during the pre-school and follow-up phases of the project and was in charge of the manuscript preparation during the write-up phase of the research.

Other staff members who contributed greatly to the project include Dr. Ellis Olim (University of Massachusetts, Amherst), who was responsible for the major analysis of maternal language; Dr. David Jackson (Toronto, Ontario), who was involved in early stages of development of categories for the analysis of mother-child interaction, and participated in the processing and analysis of data; Mrs. Dorothy Runner, who supervised the training and work of the home interviewers, acted as a liason with public agencies, and had primary responsibility for obtaining the sample of subjects; and Mrs. Susan Beal, computer programmer.

COGNITIVE ENVIRONMENT STUDY

ANALYSIS OF MATERNAL LANGUAGE STYLES - MANUAL *

SUMMER 1967

MATERNAL LANGUAGE SAMPLES

Several items administered to the mother during the home interview and in test sessions at the University, were selected for analysis of language styles employed by the mother: Typical Day, Mother-Teacher Picture, and the Children's Apperception Test Card No. 3. Tape-recordings of mothers' responses to each item were transcribed verbatim, and the typed protocols were used for language analysis.

TYPICAL DAY

During the home interview the mother was asked to describe a typical day in her home:

NOW MRS. _____, I WOULD LIKE FOR YOU TO TELL ME IN AS MUCH DETAIL AS POSSIBLE ABOUT YOUR ACTIVITIES AND THOSE OF YOUR FAMILY YESTERDAY. WE HAVE FOUND THAT WE CAN LEARN A GREAT DEAL ABOUT WHAT OUR FOUR-YEAR-OLDS ARE LIKE AND WHAT THEY LIKE TO DO IF WE FOLLOW THEM CLOSELY FOR ONE WHOLE DAY. WE KNOW THAT EVERY CHILD AND EVERY HOUSEHOLD IS DIFFERENT. WE HOPE THAT YOU WILL FEEL FREE TO TELL US IN YOUR OWN WAY ABOUT YOUR ACTIVITIES AND THOSE OF THE FAMILY AS YOU LIVED TOGETHER YESTERDAY.

I KNOW THAT IT IS OFTEN DIFFICULT TO RECALL EVERYTHING WE DO. I WILL ATTEMPT TO HELP BY ASKING QUESTIONS AT INTERVALS, OR FROM TIME TO TIME IF IT BECOMES A LITTLE DIFFICULT. WE WANT TO GET A COMPLETE PICTURE OF THE WHOLE DAY--FROM THE TIME YOU AND (FOUR-YEAR-OLD CHILD) GET UP UNTIL BEDTIME. YOU MAY HAVE QUESTIONS: I WILL BE GLAD TO ANSWER ANY THAT I CAN.

Suitable probing questions were used by the interviewer to obtain a full account of the day's activities, to fill in gaps left in the mother's narrative, and to inquire about areas she might overlook.

MOTHER-TEACHER PICTURE

During the home interview, the mother was shown a photograph of two Negro women seated on opposite sides of a large desk in a classroom. (Negro models were used for the picture, since the Cognitive Environment Study sample was composed of Negro subjects.)

The interviewer instructed the mother:

HERE IS A PICTURE OF A TEACHER AND A MOTHER TOGETHER IN A CLASSROOM. CAN YOU TELL A STORY ABOUT WHY THE MOTHER CAME TO SCHOOL AND WHAT THEY ARE TALKING ABOUT HERE IN THE PICTURE?

* The major portion of this manual was prepared by Dr. Ellis Olim, University of Massachusetts, Amherst.

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The photograph was used as a standard projective device to elicit a story with a beginning, a middle, and an end. If necessary, the interviewer asked,

WHAT WILL HAPPEN AS A RESULT OF THEIR CONVERSATION?

CAT CARD NO. 3 (LION-MOUSE)

At the final testing session, with the child present, the interviewer showed the mother Card 3 from the Children's Apperception Test, and told her:

HERE'S A PICTURE. I'D LIKE YOU TO TELL A STORY TO (FOUR-YEAR-OLD CHILD) JUST AS IF YOU WERE HOME. MAKE UP A STORY ABOUT WHAT YOU THINK IS GOING ON IN THIS PICTURE - WHAT THE EVENTS ARE THAT LED UP TO IT - HOW THEY'RE FEELING - AND HOW YOU THINK IT'S GOING TO END.

Appropriate probes were used, in standard projective fashion, to obtain a story with a beginning, middle, and end.

ANALYSIS OF LANGUAGE SAMPLES[1]

Each of the three language samples was analyzed and scored for mean sentence length and mean pre-verb length. Scores were obtained for each sample on a series of scales measuring the use of uncommon adjectives and adverbs, of different types of verb forms, of abstract nouns and verbs, and of complete syntactic structures. The two language samples obtained with projective instruments - Mother-Teacher Picture and CAT Card 3 - were also scored for introduced content and stimulus utilization.

Descriptions of the measures and the procedures used in analyzing and scoring the language samples for maternal language styles are detailed in the remaining sections of this manual.

MEAN SENTENCE LENGTH

Scale Description

The mean sentence length is obtained by dividing the total number of words in the protocol by the number of sentences.

Definition of Sentence

Traditional grammar definitions of a sentence, such as that a sentence expresses a complete thought, or consists of a subject and predicate, are unsatisfactory. Nor can punctuation in written language be taken as a reliable guide since punctuation is somewhat arbitrary and sometimes incorrectly marked. The definition of a sentence must be related to spoken speech. Here, there are three kinds of signals by which the native speaker recognizes sentence divisions: pitch, stress, and juncture (the pauses in the flow of an utterance). Contrast the following sentences:

(1) Had he come earlier, we couldn't have seen him.

(2) Had he come earlier? We couldn't have seen him!

If these are read aloud, one can see that the signals that differentiate (1) from (2) are the differences in the patterns of pitch of certain words, the stress on certain words, and the length of the pause between the two sentences in (2)--juncture.The signals denoting sentence divisions may be called sentence-completing intonation patterns.

The minimum criterion for a sentence is that it be an uninterrupted utterance, bounded by silence or change of speaker. A sentence, then, may be defined as being as much of the uninterrupted utterance of a single speaker as is included either between the beginning of the utterance and the pause which ends a sentence-completing intonation pattern. Sentences may vary from single words to elaborate syntactic structures. The precise demarcation of sentences depends on their being read aloud. Take the following conversation as an illustration:

A. Hello, John.

B. Hello. Beautiful day, isn't it? (Contrast with: Hello. Beautiful day. Isn't it? In this case, there is a longer pause after day and the intonation pattern is different.)

A. It certainly is perfect for fishing. (Contrast with: It certainly is. Perfect for fishing.)

B. That's what I'd like to be doing. But I have to work. (Contrast with: That's what I'd like to be doing, but I have to work.)

(At this point,C joins A and B.)

A. Hello, Bill. We were just agreeing that this is perfect fishing weather.
C. Yes, if you like fishing. (Contrast with: Yes. If you like fishing.) I'd rather play golf.

Sentence Fragments, Verbal Tics, and Language Mazes

Parts of utterances resulting from interruptions to the speaker are sentence fragments if they are not completed after the interruption. (Note that the interrupting pause in such instances does not signal a sentence-completing intonation contour.) If the interrupted sentence is completed subsequently, the utterance is counted as a sentence.

A verbal tic is a speech habit that has little or no more syntactic status than nonlinguistic speech habits such as occur in stuttering. Examples are repetition of single words when not done by the speaker deliberately for emphasis

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[1]Throughout, the writer has drawn heavily on examples of different syntactic structures from Francis (1958).

(he . . . he looked at the mouse); repetition of stereotypes (And, y'know, then the lion and the mouse, y'know; the lion, see, saw the mouse, see); and the habit of stringing clauses together by and when no true coordination is intended.

Language mazes are false starts and garbled phrases with no apparent meaning. Then the lion . . . and he, . . then the mouse peeped out of his hole. Here grammatical incorrectness, however, does not constitute a maze.

In the protocols, sentence fragments, tics, and mazes are bracketed and excluded from the scoring. Asides to the child are also excluded(but not questions about whether the child understands - unless the questions are verbal tics). Admonition to pay attention and questions to the interviewer about what the subject is supposed to do are asides and are excluded.

MEAN PRE-VERB LENGTH

Scale Description

The mean pre-verb length is obtained by dividing the total number of words appearing before the main verb of all clauses in the protocol (excluding imperatives and interrogatives) by the number of counted clauses (excluding imperative and interrogative clauses). Imperative and interrogative clauses are excluded (from both numerator and denominator) because by convention the main verb occurs first in such constructions, thereby obviating the possibility of pre-verb elaboration.

Where a dependent (subordinate) clause is embedded in an independent (main) clause, the main clause is treated separately from the imbedded subordinate clause and the latter, treated by itself. Example:

A friend, whose house burned down, came to see me.

Divide this into two units of analysis:

(1) A friend came to see me (two words before the main verb)

(2) whose house burned down (two words before the main verb of the subordinate clause.)

There is one case requiring special analysis, namely, when the subordinate clause is itself the subject of the sentence:

that he is a scoundrel is well known
who he is is a mystery
what you think does not interest me

In such instances, count the number of words in the subject (noun) clause as the number of words preceding the main verb of the sentence. However, also include the subject clause as a unit of analysis by itself.

ADJECTIVE SCALE

Scale Description

The adjective scale is based on the following index:

$$\frac{\text{Number of uncommon adjectives (excluding repetitions)}}{\text{Total number of words used as nouns}} \times 100$$

Definition of Uncommon Adjectives

The category, uncommon adjectives, excludes numerical, demonstrative, and pronominal possessive adjectives (my, your, his, her, its, their); the articles (a, an, the); "other"; and "another."

Definition of Adjectives

The category, adjectives, includes not only words defined traditionally as adjectives, but also nouns and verbs used as modifiers of nouns. Nouns as modifiers of other nouns include those of possessive construction and those of noun-adjunct construction. Examples:

Possessive	Noun-adjunct
child's play	child psychology
a day's work	a father image
	a dining table (gerund acting as modifier)

The following are examples of verbs functioning as modifiers of nouns:

running water	money to burn
baked potatoes	the man to see

Note that some words ending in ing are not necessarily participles or gerunds, but adjectives:

a pleasing table (synonym for pleasant)
an interesting story

Predicate adjectives are included in the adjective count. Predicate adjectives are linked to the subject by linking verbs. Examples:

the lion	was, became, seemed, remained, looked, sounded	hungry (predicate adjective)

Substitution of be without altering the basic syntactic structure can be used as a test for whether a verb is linking (copulative) or not. Some linking verbs require careful analysis:

the weather turned cold (cold is an adjective)
the wind blew a gale (gale is a noun)

Adjectives may occur as objective complements:

he painted his house green

Tallying Procedure

1. Denominator. Count every word used as a noun, including all repetitions. The sum becomes the denominator in the index.

2. Numerator. Count each uncommon adjective once only.

Computation of Index

Multiply the numerator by 100 (to remove the decimals) and divide the result by the denominator.

ADVERB SCALE

Scale Description

The adverb scale is based on the following index:

$$\frac{\text{Number of uncommon adverbs (excluding repetitions)}}{\text{Total number of verbs, adjectives, and adverbs}} \times 100$$

Definition of Uncommon Adverbs

The category, uncommon adverbs, excludes "here," "there," "now," "then," "less," "least," "more," "most," "just," "not," "yes," "no," "how," "when," "where," "what," and "why."

Adverbs in Verb Phrases

A number of verb phrases are composed of a form that also can appear as an independent verb together with a form that also can appear as an adverb, or as a preposition used as an adverb. Some grammarians treat these verb phrases as single grammatical elements. However, in this study, the adverbs and prepositions acting as adverbs are treated as adverbs. Examples:

	takes		
	puts		
	gets		over
he	throws	it	out
	holds		up
	gives		
	makes		
	plays		

Note that over, out, and up, which are here used as adverbs, may also function as prepositions, in which case they are to be excluded from the adverb count. The distinction between these words as adverbs and as prepositions may be brought out in the following ambiguous sentence:

He looked over the fence.

If the inversion, "He looked the fence over," is intended as the meaning, the word over is an adverb, part of the verb phrase look over. If the intended meaning is to convey where he looked, over is a preposition, the object of which is the fence. The distinction in use is determined by context and by different stress and pitch patterns when the sentence is spoken.

Adverbs as Verb Modifiers

Adverbs most commonly modify verbs. These adverbs should be included in the adverb count. Examples:

he speaks seldom
he drives rapidly
he was looking sidewise
he has sometimes seen
he never comes home
the train moved ahead slowly

Adverbs as Adjective Modifiers

The most frequent qualifiers of adjectives are adverbs. Examples:

	very*		
	rather*		
the	quite*		angry lion
	exceedingly		
	somewhat*		
	still		

When the adjective is in the predicate after a linking verb, a following adverb may seem to modify it. Some grammarians believe that the adverb in this position modifies the whole structure of complementation of which the adjective is a part.

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*In the newer grammars, these are considered function words which can act as qualifiers. Traditionally, they have been considered adverbs, as here.

Examples:

it is dark ahead
the house seems clean everywhere
the air feels fresh inside

Such adverbs should be included in the adverb count.

Adverbs as Adverb Modifiers

Adverbs may modify other adverbs. Examples:

very easily
rather slowly
happily enough
far away
rather too strong
almost all over
much more easily (count much but not more as the latter is excluded by definition of uncommon adverbs)

Adverbs and Other Words Not Counted

The following should not be counted as adverbs:

1. Adverbs as noun-modifiers:

his speaking rapidly
our acting together

Speaking and Acting are participal forms used as nouns (i.e., gerunds).

Some grammarians consider the following, also, as examples of adverbs modifying nouns:

the people here
the temperature outside
the conversation afterwards

However, they may also be viewed as examples of elliptical expressions:

the people (who are) here
the temperature outside (here) or the outside temperature (outside as adjective)
the conversation (held) afterwards

In the first example, here could be construed as modifying the understood verb are. In the next example, outside may be viewed as modifying here or the phrase may be considered as an inverted structure. In the third example, afterwards may be viewed as modifying the understood verb held. Since there is a difference of opinion on the classification of the words in the illustrations and since the syntactic constructions in which they occur are quite rare, the words should not be counted as adverbs in the adverb count.

2. Adverbs as preposition-modifiers. Adverbs sometimes modify prepositions. These adverbs should not be included in the adverb count. Examples:

slightly off pitch
almost beneath notice
very like a fish

3. Nouns as adverb-modifiers. Nouns sometimes, though very rarely, modify adverbs. These nouns should not be counted in the adverb count. Examples:

a foot away
some way up

4. Nouns, verbs, and adjectives as adjective-modifiers. Nouns, verbs, and adjectives infrequently modify adjectives. They should not be counted as adverbs. Examples:

nouns:	stone cold coffee
	bone dry earth
verbs:	freezing cold
	boiling hot
	hopping mad
adjectives:	dark blue
	cold sober
	icy cold

Tallying Procedure

1. Denominator. Count every adjective, adverb, and verb in the protocol, including all repetitions. Verb is defined in connection with the Verb Elaboration Scale (see below). A verb phrase is counted as one verb. Verb phrases may be quite elaborate (would have been about to leave). Various individual verbs within the verb phrase may be modified (would scarcely have been about to leave quietly). Count each adverb (for the adverb count) but count the entire verb phrase as only one verb (for the verb count). The sum of the adjectives, adverbs, and verbs becomes the denominator.

2. Numerator. Count each uncommon adverb once only. The sum becomes the numerator of the index.

Computation of Index

Multiply the numerator by 100 and divide the result by the denominator.

VERB ELABORATION SCALE

Scale Description

~~Verb elaboration scores are based on the absolute frequency of the number of different types of verb forms in the protocol. A verb form may be a single verb or a verb phrase~~. English verbs exhibit both formal and functional distinctions representing different verb forms. Each different type of verb form is to be classified on the basis of its defining attributes. All members of each class must have the same formal and functional defining attributes. Count each class as a separate verb type.

Verbs Classified by Structure and Function

1. Structures of predication. The kernel sentence consists of a subject and a predicate. The verb predicates or affirms something about the subject (noun, substantive). A predicate may be a structure of complementation.

2. Structures of complementation. Structures of complementation have two basic components: a verbal element and a complement. The complement may be an indirect object, a direct object, a subjective complement, or an objective complement.

Verbs fall into three main functional groups, which may be identified by the types of structure in which their members are found and certain other formal characteristics: (1) linking (or copulative) verbs, (2) intransitive verbs, and (3) transitive verbs.

1. Linking verbs. Linking verbs link subject and complement; they never occur without a complement. The most common linking verb is be (as a full verb, not as an auxiliary). Substitution of be can be used as a test for whether other verbs are linking verbs. If the appropriate form of be can be inserted into a structure of complementation in place of another verb without making a major change in the structural meaning, the original verb is a linking verb. Examples:

	was	
	became	
the man	seemed	hungry
	remained	
	looked	
	sounded	

Linking verbs have no passive form. (However, some linking verbs have homonyms which do have passive forms.) Since intransitive verbs also lack passives, this test is of limited value.

2. Intransitive verbs. Verbs which may appear in the active voice as complete predicates without any complement are intransitive verbs. They have no passive forms. They cannot appear as verbal elements in structures of complementation. Examples:

the machine is running
the rain stopped
the sun sinks slowly
the curtain rose

Note that run, stop, and sink have transitive forms as well.

3. Transitive verbs. Verbs which always have a complement when in the active voice and which have passive forms are transitive verbs. When a passive form is substituted for an active form, the complement or a part of it must be made the subject if the meaning is to be preserved. Examples:

Active form	Passive transformation
the man sold his car	the car was sold (by the man)
the wind blew down the house	the house was blown down (by the wind)

As previously mentioned, since some verbs have homonyms with active and passive forms and since, also, some transitive verbs have homonyms which are linking verbs, it is essential to observe a verb in its grammatical context to classify it accurately. Examples:

Linking:	the weather turned cold
	the wind blew a gale
	the music sounded loud
Intransitive:	the earth turns
	the wind is blowing
	the fire alarm sounded
Transitive:	the car turned the corner
	the musician blew the trumpet
	the watchman sounds the alarm

Subjective complements are complements appearing with linking verbs. Objects are complements appearing with transitive verbs.

Formal qualities of Verbs

Verbs may be distinguished by their formal qualities into seven heads: person, tense, phase, aspect, mode, voice, and status.[1]

1. Person. All English verbs except modal auxiliaries (can, may, shall, will, must, dare, need) have two persons, common and third singular. Examples of the third singular:

the man walks
this looks good
eating candy causes tooth decay

[1] The terminology used here generally (though not completely) follows that of Trager and Smith (1951) and Francis (1958)

Examples of the common form:

dogs bark
I walk
they shine brightly

The verb be, whether as a full verb or as an auxiliary, has an additional form, the first-singular am (as in I am) and a common person form are (as in they are).

2. Tense. All English verbs except a few auxiliaries (ought, must) have two tenses, the common (or present) tense and the past (or preterit) tense.

3. Phase. English verbs except a few auxiliaries have two phases, the simple and the perfect, which is marked by the use of various forms of the auxiliary have with the past participle form of the verb. Examples of the perfect phase:

he has spoken
we may have been
I should have worked
he has gone

Intransitive verbs have a resultative phase, formed with the auxiliary be and the past participle form of the verb:

he is gone
they are finished with the work
I am done with you

Verbs not in the perfect or resultative phase are in the simple phase.

4. Aspect. Verbs have three aspects: the simple, the durative, and the inchoative. The simple aspect is unmarked. The durative is formed by the auxiliary be and the present participle:

he is talking
she was swimming
we ought to be working

The inchoative aspect is formed by the auxiliary get and the present participle:

we got talking
let's get going
we ought to get working

5. Modes. Verbs have a variety of modes. The modes can be classified on the basis of form into two groups: (1) those formed by the modal auxiliaries and the base form of the verb and (2) those formed by certain other auxiliaries and the infinitive. The modal auxiliaries are can, may, shall, will, must, dare, need, do. The auxiliaries which form modes with the infinitive are have, be,

be going, be about, used, ought, get, have got. Auxiliaries appearing with the present participle exemplify the durative aspect (if the auxiliary is a form of be) or the inchoative aspect (if the auxiliary is a form of get). The auxiliary forms of have appearing with the past participle exemplify the perfect phase. Forms of the auxiliary be appearing with intransitive verbs illustrate the resultative phase.

As noted above, auxiliaries are of two forms, modal and other. Auxiliaries may also be classified on the basis of the form of the main verb with which they appear.

a. Auxiliaries appearing with the base form of the verb:

can/could	may/might	shall/should
will/would	do/does/did	must
dare	need	(had) better/best

b. Auxiliaries appearing with the present participle:

am/is/are/was/were
get/gets/got

c. Auxiliaries appearing with the past participle:

am/is/are/was/were
get/gets/got
have/has/had

d. Auxiliaries appearing with the infinitive form of the verb:

have/has/had
ought
used
am/is/are/was/were
get/gets/got
am/is/are/was/were (about
(going

A verb phrase may belong to two modes at the same time. In such a case, only one may be from the modal auxiliary group and its auxiliary always comes first in the phrase:

he would have to work
he could be about to work
she may be going to tell us
they used to have to work

It may be seen that auxiliaries may combine with one another to build quite elaborate verb phrases, which themselves act as auxiliaries of full verbs:

was going	used to have to be going
might have been going	was getting going
might have fed	might have been fed
can get fed	was being fed
will be fed	should have been getting fed
has been fed	used to have to be getting fed
might have had to go	ought to have gone
has been going to eat	used to be being fed
would have been about to leave	was to have been told

Auxiliaries may be used in elliptical expressions:

I will (come) if I can (come)
I guess I had better (come) (Context supplies understood word)
must I(come) (Context supplies understood word)
yes I am (coming)
I already have (come)
I suppose I have to (come)
I guess I ought to (come) though I never used to (come)
I'm going to (come) pretty soon

6. Voice. English verbs have two voices, the active voice and the passive. Examples of active voice:

he kills
they built a house
we have done the work

Passive voice forms consist of some form of the auxiliary be with the past participle form of the verb. Passive forms using get as the auxiliary with the past participle shall also be counted as instances of the passive voice even though grammarians are not agreed as to the status of the get form of structure.

be-passive	get-passive
he is killed	he gets killed
the house was built	the house got built
the work has been done	the work has got done

It is important to distinguish subjective complements from instances of the passive voice. The two may be alike in form. Two syntactic structures that are exactly alike in the written form and that are sometimes alike in speech are the be-passive and the verb be with a past participle as subjective complement. Consider the following:

the house was built by experts
the house was built of wood

In the first sentence, there is a passive verb, was built, modified by the prepositional phrase by experts. In the second sentence, the verb is was, with the structure of modification, built of wood, serving as subjective complement. Apart from the juncture (in speech), which may indicate where the division between the immediate constituents of the predicate falls (either before or after built), the only way these structures can be formally distinguished is by means of the presence, actual or possible, of a phrase containing the preposition by. The latter always indicates the passive. Further examples:

Passive:	the man was informed by his wife
	the student was interested by his teacher in studying
Subjective complements:	the man was informed about politics
	the student was interested in studying

Note that the context may indicate that the latter are not actually subjective complements, as when the meaning is as follows:

the man was informed about politics by his wife
the student was interested in studying by his teacher

7. Status. English verbs have six statuses: the affirmative, the imperative, the interrogative, the negative, the negative-imperative, and the negative-interrogative. The imperative is marked by ellipsis of the subject:

be careful
love your neighbor

The interrogative status is marked by a change in word order involving inversion of the subject and the auxiliary or the first auxiliary if more than one are present. Verbs which have no auxiliary in the affirmative status use the auxiliary do/does/did to form the interrogative, except be, which simply inverts subject and verb, and have, which may invert or may use forms of do. The auxiliaries get, used (to), and have (to) also use forms of do. Examples:

Inverted forms	do-forms
is he working	does he work
has he worked	did he work
should he have worked	did he get killed
is he going to work	does he have to work
	did he use to work

The negative status is marked by insertion of the word not immediately after the first auxiliary. The forms of do are used if no auxiliary is otherwise present, but do is not used with be (except in the imperative) and not always with have. The forms of do are used when the auxiliary is used (to), have (to), or a simple form of get. Examples:

he is not working	he is not here
he has not worked	he has not any money
he should not have worked	he does not have any money
he is not going to work	he did not use to work
he does not work	he used not to work

The negative-imperative status is marked by insertion of the word not after the verb (not necessarily immediately after it) or by use of forms of do and the word not. Examples:

ask not for whom the bell tolls
ask him not
do not ask for whom the bell tolls
don't ask it of me

The negative-interrogative status combines the interrogative and the negative. The use of the auxiliary do follows the same pattern as in the interrogative forms. There are two forms:

not-first form	subject-first form
isn't he working	is he not working
hasn't he worked	has he not worked
shouldn't he have worked	should he not have worked
doesn't he work	does he not work
hasn't he any money	has he not any money
doesn't he have any money	does he not have any money

The Verb DO

1. The verb-substitute DO. The verb do and its various inflectional and phrasal forms may appear in place of any full verb that has already appeared in the immediate linguistic context. Examples:

he works harder than I do
it sounds better than it did before
I am already doing it
he has accomplished more in a week than I have done in a year

2. DO as auxiliary:

do you often go to the movies
he does look like that
how do you do

3. DO in elliptical expressions:

he liked it but I didn't
I go there frequently; do you

4. DO as a full verb:

he does a great deal of work
how do you do
we must do better

Separable Verbs

Separable verbs were previously discussed in connection with the adverbial component of verb-adverb combinations. The verb component of these combinations is treated as the verb form. Examples:

	takes		
	puts		over
he	gets	it	out
	throws		up
	holds		

When a noun is substituted for it in the above construction, the adverb component may come next to the verb component:

he puts his message over
OR
he puts over his message

Same Verb Form with Different Functions

The function of a verb is one determinant of its form. If the morphemically same verb form plays different roles (appears in different syntactic structures), each role is counted as a separate verb form. One situation requires that a distinction be made between structures of modification and structures of complementation. In structures of modification, nouns may function as verb modifiers. Examples:

he lived a year
he walks this way
he saw a mile

Year, way, and mile are not objects of the verbs. On the other hand, in structures of complementation, the noun is the object of the verb. Examples:

he lived his life
he likes his own way
he measured a mile

If an adjective occurs in a structure of modification of a verb, a different verb form results:

the children ran wild
the dog went crazy
the show fell flat

Note the subtle difference between the above forms and those shown in structures of complementation (p.8).

Another verb form occurs where a verb modifies a verb:

the children came running
I prefer to eat sitting
he lives to eat
they came to pray

Another verb form occurs when a verb is the object of a verb:

he loves to eat
he wants to succeed

Where the main (or head) verb may be both intransitive and transitive, ambiguity may rest, as in

he loves to live

There is no way to tell, either in speech or in writing, whether this means "he loves in order that he may live" or "he loves the act of living." The decision, however, can probably be made by contextual clues.

Another verb form occurs where an infinitive phrase is a structure of predication:

I asked him to call
I know them to have been told

Note that this type of structure is considered a clause in the Clause Elaboration Scale (described later).

Another verb form occurs in the case of the verb complement:

we watched them go
we heard him singing

Ambiguous Cases

The following are ambiguous:

driving slow annoyed him
driving slowly

In such cases, count the participle form as a noun, not a verb, as in the following examples of verbal nouns:

my driving slow annoyed him
my driving slowly annoyed him
my slow driving annoyed him

However, in the following case, the form is a verb and it is the entire clause which is the noun:

driving a car slow annoyed him

The presence of a direct object (car) distinguishes this case from the foregoing verbal nouns.

When verbs are objects of prepositions, they are counted as nouns, not as verbs:

a way of doing
a day for resting

But, note the following, which are verbs, because the entire phrase is the object of the preposition and the participle acts as a verb within the phrase:

a way of doing it
a day for resting your limbs

As described under the Adjective Scale, verbs used as adjectives are classified as adjectives, not verbs:

running water
baked potatoes
the man to see

ABSTRACTION SCALE

Scale Description

The abstraction scale is based upon the following index:

$$\frac{\text{Number of abstract nouns and verbs (excluding forms of be and excluding repetitions)}}{\text{Sum of the above plus concrete nouns and verbs (excluding forms of be and excluding repetitions)}} \times 100$$

Definition of Abstract and Concrete

Dictionary and traditional grammar book distinctions between "abstract" and "concrete" are not suitable guides to the true distinction between abstract and concrete words since they make the assumption that words are either concrete or abstract because of their form. As Sheffield (1912) demonstrated, any noun, whether the name of a thing or of an attribute, is abstract when it is thought of apart from the cases in which it is actually experienced. Conversely, when thought of as realised in objects and instances, it is concrete. So-called "abstract" nouns may have concrete meaning just as much as other nouns. Whiteness, when thought of as the quality of whiteness, is abstract. However, a whiteness is an object

and concrete. Webster cites poem as a concrete noun and poetry as an abstract noun. Yet, when we say that the poem is a form of writing, we are using it as an abstract noun. When we speak of Keats' poetry (intending his poems), we are using poetry as a concrete noun.

Words apart from context are neither abstract nor concrete. The true distinction between abstract and concrete lies in the proposition being expressed. To make the distinction, one must rely on meaning and context. Examples:

Abstract	Concrete
beauty is a rare quality	she is a beauty
the lion is an animal	the lion stalked his prey. By nightfall the animal was tired

Another sometimes useful guide to differentiating between abstract and concrete words is the degree of inference one has to make about the referent or referents of the word. This may be especially helpful in classifying verbs. Where the verb describes a specific action or event so that the predication is definite and specific, the verb is concrete. The greater the degree of inference one must employ as to what the verb is describing or affirming, the greater the likelihood that the verb is abstract. Examples:

Concrete	Abstract
he walked home	he walked alone through life
he went to the store	he went out of his mind
he erred in his calculations	to err is human
she loves him	love thy neighbor

Tallying Procedure

1. Denominator. Count each different noun and verb in the protocol. Different forms of the same root word are counted as separate words. The sum of the nouns and verbs becomes the denominator in the index.

2. Numerator. Count each different abstract noun and abstract verb. Different forms of the same root word are counted as separate words. The sum of the abstract nouns and verbs becomes the numerator of the index.

Computation of Index

Multiply the numerator by 100 and divide the result by the denominator.

STRUCTURE ELABORATION SCALE

Scale Description

The structure elaboration scale is based upon the following index:

$$\frac{\text{the total number of complex syntactic structures, weighted as described below}}{\text{Total number of sentences (as defined earlier)}} \times 10$$

Definition of Complex Syntactic Structures

Complex syntactic structures, as used herein, include the following types of structures: (1) coordinate clauses; (2) subordinate clauses; and (3) certain types of structures (hereinafter described) including those which are considered phrases by some grammarians and clauses by others and phrases which are syntactic equivalents of clauses.

Definition of Clause Coordination

A structure of coordination consists of two or more syntactically equivalent units joined in a structure which functions as a single unit. Where the syntactically equivalent units are clauses (clauses are basically structures of predication), they are coordinate clauses. A structure of coordination which has more than two components is called a series. Example of a clause coordination:

the house was painted white and the barn was painted red

Clause coordinations may involve elliptical structures:

the house was painted white and the barn (was painted) white

In structures of coordination, it is sometimes difficult to be sure about the level on which the coordination takes place. Such structures are frequently structurally ambiguous:

(a) he was born and lives in Chicago

(b) he was born and lived for forty years

In (a) the coordination occurs at the verb level and is not an instance of coordinate clauses. The phrase in Chicago modifies a compound verb was born and lives. In (b) the meaning tells us that a person cannot be born for forty years. The phrase for forty years modifies only lived. Hence, we may assume that (b) is coordinated at the clause level and syntactically is an ellipsis having the same meaning as the following sentence:

he was born and he lived for forty years

It may be noted that (a) could be construed as an elliptical construction:

he was born (in Chicago) and (he) lives in Chicago

The probability is greater that (a) is an example of verb coordination. Of course, the following sentence is unquestionably a true clause coordination;

he was born in Chicago and he lives in Chicago

Another example of a structurally ambiguous sentence is the following:

he is either extremely clever or totally mad

The ambiguity is caused by the inclusion of the qualifiers, extremely and totally. Without them, the sentence would read:

he is either clever or mad

It becomes clear that this is a compound predicate adjective and not a coordination of clauses. In the following, however, we do have a clause coordination:

either he is extremely clever or (he is) totally mad

Very real problems are presented by structures which are rhetorically poor but which occur nevertheless in speech and writing. Examples:

(a) he not only came to town but to my house

(b) I either must sell my car or my furniture

(c) he is not only intelligent but he has a good education

Sentence (a) could be interpreted as an instance of a compound predicate as in the following inversion:

he came not only to town but to my house

However, it seems better to treat it as an elliptical structure of clause coordination:

he not only came to town but (he also came) to my house

In (b) there are several reasonable versions:

(1) I either must sell my car or (I must sell) my furniture

(2) either I must sell my car or (I must sell) my furniture

(3) I must sell either my car or my furniture

The first two are clause coordinations; the third is a compound direct object. As in the case of (a) above, the preferred treatment is to consider (b) as an instance of clause coordination.

Sentence (c) is a split structure. The first part of the correlative (not only) is erroneously inserted in the middle of the first component of the structure of coordination. By shifting the word order a better sentence is manufactured:

not only is he intelligent but he has a good education

This is clearly a structure of clause coordination.

Although it is difficult to formulate an unequivocal rule regarding the interpretation of elliptical constructions, care should be exercised not to resort to the indiscriminate use of "understood elements" found in some traditional grammars. Example:

he is bigger than I (am big)

This method of creating a structure of clause coordination is unwarranted.

Subordinate Clauses

In traditional grammar, the two major types of clauses are main, or independent, clauses and subordinate, or dependent, clauses. Subordinate clauses involving reference to an antecedent are called relative clauses. Subordinate clauses come in a wide variety of types and only some of the types will be illustrated.

the fact that it is raining is discouraging	(modifies fact)
we heard the news that the war is over	(modifies news)
he came after I left	(modifies came)
I will go wherever you go	(modifies will go)
so hungry that I could eat an ox	(modifies hungry)
stronger than he was before	(modifies stronger)
he walked so slowly that he hardly moved	(modifies slowly)
he studies harder than I ever did	(modifies harder)
he drove the car as if he was going to a fire	(modifies drove the car)
when he comes we will go	(modifies all the rest of the sentence)
if it rains close the windows	(modifies all the rest of the sentence)

Relative Clauses

the team that scores highest
a boat which I sail
he is not the man that he once was
the story to which he referred
the man that I gave it to
whatever you do I shall follow my own desires (modifies rest of sentence)
no matter who he is I don't like him (modifies rest of sentence)
never mind if it's raining, we'll (modifies rest of sentence)
have the picnic

Clauses as Subjects

that he is a scoundrel is well known
how you do it is important
who he is is a mystery
what you think does not interest me

Clauses as Complements

tell him that I am here	(direct object)
this is where I get off	(subjective complement)
give whoever comes the message	(indirect object)
his wife made him what he is	(objective complement)
he is friendly with whoever will flatter him	(object of proposition)

Infinitive Clauses

Infinitive clauses are clauses whose constituents are a relative pronoun and an infinitive. They shall be counted as clauses. Examples:

what to do is my problem
she does not know where to go
the problem is who(m) to ask
a place in which to work is what I want

Other Infinitive Structures

There are several other types of infinitival structures which are usually classified as phrases, but which are relatively complex syntactic structures and are included in the Structure Elaboration Scale. Examples:

to be sure, he didn't mean it
to drive well, you must be alert

These structures modify the rest of the sentence. They should not be confused with infinitives modifying nouns:

his wish to be admired is an obsession

To be admired acts as an adjective, modifying the noun wish.

Another infinitive structure, generally classified as a phrase, shall be included in the Structure Elaboration Scale. Examples:

I asked him to call
He told John to come at ten

Participial Structures

Participial structures are generally classified as phrases. However, they are to be included in the Structure Elaboration Scale. Examples:

continuing with our story, the next chapter is a sad one (dangling participle)

Note the similarity of this to the infinitival structure (which would also be counted): to continue with our story.

following a good dinner, we heard a brief speech
it rained heavily, turning the field into a sea of mud (trailing participle)
the job, considering the short time, was well done (medial participle)

Participial structures shown above are not to be confused with absolute constructions, which act as noun modifiers, i.e., adjectives. Examples:

the vans having arrived we were ready to move
the work finished we went home

Elliptical Structures

The following types of elliptical structures shall be counted:

although (he was) hungry he did not stop
after (we had) dinner, we talked (most grammarians treat after dinner as a phrase)
while (he was) at college he fell sick
the cake should be removed from the oven when (it is) done
however strong (it is) coffee never keeps me awake
never drink while (you are) driving

Elliptical structures may be instances of relative clauses:

(a) a place (to which, where) he goes in summer
(b) a story (which) I heard
(c) the man he told his story to (ellipsis and inversion of to whom he told his story)
(d) that man, I know, is honest
(e) the door, he told us, will be open
(f) you were our friend, I thought

Note that (d), (e), and (f), are essentially the inverse of the following sentences. In the former, the interpolated clauses are subordinate. In the following, the clause status is reversed:

(g) I know (that) that man is honest
(h) he told us (that) the door will be open
(i) I thought (that) you were our friend

Though the structures are subtly different, the clause count is the same in both types of structures.

(j) the trouble is (that) he can't swim
(k) (that) he doesn't try is the reason for his failure

Infinitive structures may also contain ellipses:

he told John to come at ten and Bill (to come) at noon

Weighted Index of Structures

The following system, based in part on Loban's weighted index of subordination, is used for weighting the types of structures included in the Structure Elaboration Scale:

1. Simple coordination. Count 1 point. Example: He was afraid and he was lonely. Credit is given for the act of coordination, not for each coordinate clause.

2. A series of coordination. Give 1 point for each member of a series of coordination except the first. Example: He had his pipe and he had his bowl and he had his fiddlers three. This counts 2 points. The following also counts two points: He had his pipe, he had his bowl, he had his fiddlers three.

3. Coordinations of Complex Syntactic Structures. Count 1 point for the act of coordination and 1 point for each of the coordinated clauses. Examples:

he went to the store because he was hungry and (because) he could get food there

he told John to come at ten and Bill to come at noon

The total count in these cases is 3 points.

4. Structures other than clauses. Count 1 point for each syntactic structure other than subordinate clauses. This includes so-called infinitive clauses, other infinitive structures, participial structures, and elliptical structures not otherwise covered under subordinate clauses.

5. Simple subordination. Count 1 point. Example: He was afraid because he was lonely. The man who was wearing a green hat went home. These are called first-order dependencies.

6. Second-order dependence - unimbedded. A dependent clause modifying (but not embedded within) another dependent clause counts 2 points. The modified dependent clause gets 1 point, making a total of 3 points. Example: The man who was wearing a hat, which was green . . . The second clause modifies the first.

7. Second-order dependence - embedded. A dependent clause within another dependent clause (or a complex syntactic structure embedded within another) counts 3 points. Example: Although the man, who was wearing a hat, stood up . . . The relative clause is embedded within the subordinate clause. Counting 1 point for the subordinate clause and 3 points for the embedded clause, this type of structure counts 4 points.

8. Third-order dependence. Because third-order dependence is so rare, differentiation between embedded and unimbedded structures need not be made at this level. A third-order dependence consists of a dependent clause (or complex structure) modifying or embedded within another dependent clause which, in turn, modifies or is imbedded in another dependent clause. Count third- order structures

4 points. Example: The mouse knew that if the lion, who was fierce, came out, he would be eaten up. Count 1 point for the noun clause object of knew, that if the lion, who was fierce, came out, he would be eaten up. Count 3 points for the imbedded clause, if the lion . . . came out. Count 4 points for the clause, who was fierce. The total, then, is 8 points. Parsing the three points may help the analysis:

(a) that . . . he would be eaten up
(b) if the lion . . . came out
(c) who was fierce

The following structure also would receive 8 points: Although the man who was wearing a hat which was green, stood up . . .

9. Dependence on Coordinate clauses. A clause subordinate to a coordinate clause does not increase its value, but is counted 1 point. Example: He had a pipe and he had a cane because he had hurt his foot. Count 1 point for the coordination and 1 point for the subordinate clause, because he had hurt his foot.

10. Repeated pairs. Repeated subject-verb pairs are not counted in the clause count. He thought and he thought gets no point for coordination.

Tallying Procedure

1. Denominator. Count the total number of sentences (as defined).

2. Numerator. Count each complex syntactic structure in accordance with the weights accorded each, including all repetitions of similar types of structures. The total becomes the numerator.

Computation of Index

Multiply the numerator by 10 and divide the result by the denominator.

CONTENT ELABORATION SCALE
(for use with projectives)

Scale Description

The content elaboration scale is based upon the following ~~index~~:

$$\frac{\text{Number of different characters and objects not present in the picture but present in the story}}{\text{~~Total number of characters and objects, both introduced and present in the picture, excluding repetitions~~}} \quad \text{~~x 100~~}$$

~~Tallying Procedure~~

~~1. Denominator. Count each character and object mentioned in the story including those that are in the test picture and those that are not.~~

~~2. Numerator - Count the number of introduced characters and objects - those not in the last picture.~~

~~Computation of Index~~

~~Multiply the numerator by 100 and divide the result by the denominator.~~

SUMMARY MEASURES OF MATERNAL LANGUAGE STYLES

LANGUAGE FACTOR SCORE

A principal component factor analysis was done using scores on the various language scales from all three language samples. The factor structure included a single factor composed of Mean Sentence-Length, Mean Pre-Verb Length, Verb Elaboration, and Structure Elaboration. These four measures on the three language samples were submitted for a second principal component factor analysis; factor scores on the first rotated factor were obtained for each subject.

LANGUAGE ELABORATION T-SCORE (LET)

Scores for Mean Sentence-Length, Mean Pre-Verb Length, ~~the Adverb Scale~~, Verb Elaboration Scale, and Structure Elaboration Scale, were converted to z-scores, separately for each of the three language samples, for each subject.

The mean z-score across the ~~five~~ four scales was computed within each language sample for each subject (sum of z-scores on ~~five~~ four scales, divided by ~~5~~ 4). Finally, the mean z-score was converted to a T-score within each language sample, for each subject ($T = 50 + 10$ [mean z-score]).

AVERAGE LET SCORE

For each subject, the three LET scores - for three language samples - were summed and divided by 3, to provide an Average LET Score. The Average Language Elaboration T-Score summarizes the subject's scores on ~~five~~ four language scales across three language samples.